

Pride and Promise: The Enactment and Salience of Identity Among First-Generation Student Veterans in Engineering*

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Our multi-method qualitative study examined how educational experiences of first-generation student veterans in engineering (FGSVE) in the United States are shaped by their first-generation, engineering, and military identities. Our study explores the extent to which FGSVEs' first-generation identities are central to the FGSVEs, as compared to their military and engineering identities. We also investigate how these identities are related to one another and whether they influence the FGSVEs' engineering education experiences. Our qualitative data were derived from 15 in-depth interviews of FGSVEs conducted at four institutions in Fall 2016 and Spring 2017. Our case studies of four of these FGSVEs reflect several themes pertaining to identity salience, including: "The military was a bridge beyond first-generation status and into engineering;" "The military provided access to higher education and an engineering career will provide financial security;" "There is a dissonance between my first-generation, engineering, and military identities;" and "The military was both a detour and a necessary pathway into engineering education." The results reveal that the FGSVEs' engineering and military identities were more central to their current experiences in engineering education than their first-generation status. All of these identities, however, were a source of pride in that the FGSVEs felt a sense of accomplishment for serving in the military, pursuing a college degree, and succeeding in a challenging major like engineering. For these students, their military service and engineering pursuits both offered promise for upward mobility. The results have implications for the design and implementation of programs for first-generation students in engineering and for student veterans in general.

Keywords: engineering education; first-generation student; identity; student veteran

1. Introduction

Colleges across the United States (US) have sought to broaden access to higher education for a variety of groups, including military veterans and first-generation students (FGS, students whose parents did not attend college or have some college but did not earn a college degree). Most FGS research focuses on students who attend college directly after high school. Student veterans, however, generally have more complex pathways into and through higher education and are exposed to distinctly different life experiences from traditional-age college students. Learning more about the relative importance of identities for first-generation student veterans in engineering (FGSVEs) is imperative given that FGS have been described as "students on the margin" of higher education [1, p. 29] and as an "overlooked demographic" in engineering education [2, p. 1]. Similar labels of vulnerability have

been applied to student veterans who "occupy a third space" in which "student veterans are students, veterans, and the unique mesh of the two identities" [3, p. 661].

This current study seeks to fill a research gap in both veteran studies and engineering education on identity development and salience. Research documents the multi-dimensional nature of FGS identity [4]. A separate literature recognizes the complexity of student veteran identity [5]. Following the recommendation of Jenner [6], our study integrates these two bodies of work to better understand the salience of identity among first-generation student veterans. The few studies conducted on student veteran identity [5, 7, 8] do not specifically address student experiences in a particular field. Our study is unique because in addition to examining FGS and military student veteran identities, we locate our study within an engineering education context and offer a closer examination of academic identity.

The current focus on FGSVE extends our prior work on first-generation transfer students in engineering, which indicated that first-generation students enact various forms of social capital and community cultural wealth to succeed in engineering [9, 10]. The current study also adds to our recent research on the fluidity of student veteran identities, which showed that some student veterans actively choose not to enact their veteran identity while pursuing their educational studies [11]. Our prior study on identity salience for women student veterans revealed their perceptions that gender was not particularly salient to their military or engineering education pursuits [12]. This study aims to explore the salience of first-generation status to engineering education experiences.

In this paper, we focus on 15 FGSVEs, drawing on their narratives derived from in-depth interviews and responses to an identity exercise. We explore the following research questions:

1. To what extent are the FGSVEs' first-generation identities central to the FGSVEs, as compared to their military and engineering identities?
2. How are first-generation, military and engineering identities related to one another?
3. In what ways do first-generation, military, and engineering identities influence the FGSVEs' engineering education experiences?

Theoretically, our work was informed by two inter-related identity frameworks: multi-dimensional identity theory [13] and the constellations of identity framework [14]. Methodologically, our approach was enhanced with an innovative research tool developed by the research team, the Student Veteran Identity Circle [15].

In presenting the results, we first summarize patterns of identity salience across the 15 participants and then present four case studies to learn more about the complex nature of identity salience for these students. We selected these four case studies as they provide diverse examples of the relative importance of first-generation, student veteran, and engineering student identities.

The study results will be of interest to researchers who explore the experiences of engineering students, student veterans, and first-generation students. Learning more about these students' educational experiences and identities (and how they overlap) can lead to the more careful development of support programs by university personnel including faculty, administrators and veterans' services coordinators. Our qualitative research methods and theoretical approach may also be useful for other researchers interested in studying other specific and often marginalized populations.

2. Literature review

2.1 First-generation students

A US Department of Education report revealed that first-generation students were less likely to earn a college degree in six years than students whose parents had some college education (50% of FGS versus 64% of non-FGS) [16]. Researchers have identified the challenges that many FGS face in higher education. FGS are often less academically prepared than their continuing-generation counterparts, express lower educational goals, and may lack the social and cultural capital often required for entry into higher education [17]. Once they enter college, FGS may experience lower levels of academic self-efficacy than non-FGS students experience [18]. First-generation status is the strongest predictor of leaving college before the second year of academic study [19].

Research also documents negative educational outcomes for FGS in engineering. For example, engineering graduates whose parents had earned a Bachelor's degree experienced higher initial earnings than students whose parents did not earn at least an Associates degree; these earnings differences were not found for other degree fields [20]. FGS in engineering often cannot take advantage of enrichment opportunities related to their major, such as co-ops and internships, due to the need to work part- or full-time outside their studies [21].

FGS also bring strengths to their educational pursuits. For example, FGS express confidence in their ability to succeed and are proud of their persistence and strong work ethic [22]. In engineering, FGS successfully enact "funds of knowledge" derived from their family and social class backgrounds [23, p. 199] and draw from family-based community cultural wealth [10] to succeed in engineering education.

2.2 Student veterans

In the decade since the Post-9/11 GI Bill was enacted in 2008, the US government has provided \$75 billion in financial aid to help more than one million student veterans achieve their educational goals [24]. Many student veterans have obtained skills as a result of their military experiences that are highly relevant to engineering [25]. For example, many student veterans are assigned to military occupational specialties (MOS) or "Rates" that are technical in nature. Crawford and Burke's [26] research revealed a parallel between ABET-defined student outcomes and skills gained in the military. Also, as a result of their military experiences, many student veterans have been exposed to professional skills that are important in engineering education, such as

teamwork, leadership, and communication skills [27].

Student veterans are more likely than their non-military counterparts to be FGS [28] and share several risk factors in common with FGS, including delayed college enrollment, being less academically prepared, possessing lower levels of social and cultural capital, and coming from lower income backgrounds [28]. Student veterans may experience unique disadvantages as compared to other FGS, including having to make a major cultural transition from the military, which controls most aspects of their lives, to the unstructured freedom of civilian life [29]. Student veterans also often experience a larger gap in time between high school graduation and their college studies. Morreale's study of student veterans found that educational variables (including being a first-generation student) were stronger predictors of academic self-concept than military variables (e.g., rank, times deployed, combat exposure) [30]. That is, for student veterans, first-generation status was associated with lower academic self-concept, while military characteristics were not.

The military also provides certain advantages to FGSVs that are not available to traditional FGS. Research on traditional FGS indicates that their lower self-ratings of leadership abilities have a negative impact on persistence in college [31]. However, many FGSV develop unique leadership skills as a result of their military experiences and often bring these skills to their college pursuits [27]. Also, research suggests that the military socialization process (e.g., emphasis on group cohesion and teamwork) results in lower levels of materialism, which in turn reduces the impact of first-generation status on FGSVs [32].

An underlying theme of this brief literature review is that neither first-generation students nor student veterans are monolithic groups [4, 6]. Within each group, students have different experiences and enactments of identity, reflecting their varying "social class, racial, ethnic, or socioeconomic backgrounds; academic experiences; and family dynamics, all of which may have varying degrees of salience" for their academic experiences [33, p. 212]. Without additional knowledge about identity salience for this group, it may be difficult to discern whether student veterans face advantages or disadvantages due to their first-generation, veteran, or engineering statuses. The section below outlines the promise of this line of investigation and the theoretical frameworks that were particularly useful for our current investigation of FGSVEs.

2.3 Theoretical frameworks

Our study responds to the call for more research on

the intersectionality of first-generation status with other statuses [4] and on the intersecting identities of student veterans [6]. The literature recognizes the dynamic and evolving nature of identity, as the salience of various identities ebbs and flows through time [34]. Hui's study revealed that FGS identity development was an iterative process, with the relative importance of FGS status shifting throughout one's academic career [35]. FGS often face the subsequent challenge of multidimensional identity negotiation [4]. Cate's study on role identity revealed that student veterans who perceived themselves more as "students" than as "veterans" were more likely to positively perceive their transition from the military to college [36].

While several studies have focused on the intersectional nature of FGS identities (e.g., [22, 37]), ours is among the first to examine the relative salience of first-generation, student veteran, and engineering identities. To more fully explore the dynamic elements of identity, we draw on the model of multiple dimensions of identity (MMDI) and the constellations of identity framework. While intersectionality theory [38, 39] informs our study, these two models—MMDI and constellations of identity framework—add important perspectives and more flexibility in our research approach [13, 14].

The MMDI was developed to recognize the dynamic options for students' enactment of multiple identities over time and place [13]. The development of this model originated in mathematics and physics [40] and thus is particularly relevant for application to engineering. According to Jones and McEwen, a student's various identities revolve around their core identity; these identities all change in relative importance, depending on the influences of sociocultural conditions, family background, and current experiences [13].

Iverson's "constellation of identities" model also allows for a deep understanding of the fluid and dynamic nature of identity construction and enactment [14]. Using the metaphor of a constellation of stars, Iverson states that "identity is much like a constellation [in that] one's sense of self or self-awareness is formed through the *apparent magnitude* of particular dimensions of one's identity" (14, p. 137, emphasis in original). As with an actual constellation, the "stars" (i.e., identities) in one's particular "constellation" of identities may be fainter or stronger, depending on several factors, including context and timing of identity enactment.

3. Methods

3.1 Study background

Our multi-method qualitative study explored the

military and educational experiences of student veterans at four institutions. The results reported here are derived from in-depth interviews with 15 FGSVEs. Participants were recruited through our personal networks and contacts on the campuses, including student services personnel, engineering faculty and staff, and staff working with student veterans. The Institutional Review Board at each institution approved our study. Each interviewee received a \$50 incentive for participating in an interview.

3.2 Interview methods and data analysis

During the interviews, participants completed an identity circle through which they illustrated and discussed the various identities important to their current engineering education experiences. Our development of this method, explained more fully in [15], was inspired by Jones and McEwen's research on college student identities [13]. The identity circle is a series of three concentric circles, surrounding an "inner core" representing one's "core self." Participants were asked to place various identities from a provided list that included demographics, family-related, and service-related identities on the identity circle to reflect the relative importance of the identities to their current engineering education experiences (see Table 1). The closer the participant placed an item to the center of the circle, the more important that identity was for that particular participant (Level 1: inner circle and closest to the core; Level 2; middle circle; Level 3: outer circle and furthest from the core).

Participants' placement and subsequent discussions of their identities revealed the potentially overlapping nature of the various identities and their relative salience to the FGSVEs' current experiences. For this paper, we focus on the relative importance of first-generation status, socioeconomic status (SES), engineering identity, and military identity. We include SES as research has shown that social class is a salient concern among FGS, and because FGS status and SES are closely related [41].

All interviews were transcribed and verified. We initiated the analysis by writing an episode profile

for each interview, highlighting key points and illustrative quotes [42]. We selected power quotes to highlight the themes related to our research questions [42]. Following Strauss and Corbin [43], our subsequent three-step coding process consisted of open coding (identifying key themes related to our research questions), axial coding (categorizing the initial themes into the broader themes as they related to the experiences of the FGSVEs), and selective coding (connecting these latter categories with one another and identifying subcategories within each). A final round of review and coding involved identifying passages related to identity enactment that were not directly in response to the interview questions about the identity circle. The resulting matrix of codes and themes allowed us to compare across and within participants' transcripts to assess the depth and breadth of the themes [44].

4. Results

4.1 Description of sample

In our larger study, we interviewed a total of 60 student veterans in engineering. Of these 60 interviewees, 28 were first-generation students. For this paper, we then selected those 15 respondents who completed an identity circle and whose parents has not earned a college degree, including an Associate's degree.

Demographic characteristics of participants are shown in Table 2. Participants came from several engineering majors and all branches of the US military. Four participants were currently serving in the Reserves or National Guard at the time of the interview. The participants' ages ranged from 20 to 44 years old and length of service ranged from five or fewer years to more than 20 years.

4.2 Summary of FGSVE identity placements

Table 3 summarizes the FGSVEs' placement of the following four identities on the identity circles: first-generation student, SES, military veteran, and engineering student.

This summary suggests that first-generation and SES identities were somewhat less central to these participants than their military or engineering iden-

Table 1. Identities Provided to Participants as Prompts for the Identity Circle

Self	At home	Student/worker	Service-related
Gender	Spouse/partner	Engineering student (general)	Veteran in general
Race/ethnicity	Parent	Engineering student (Major: ____)	Veteran: specific branch (Branch: ____)
Socioeconomic class (SES)	Caregiver	Transfer Student	Combat veteran
Sexual orientation	Single	First-generation student	Reservist
Age	Family	Employee	Disability
Religion		Volunteer	

Table 2. Demographic Characteristics of Participants

Demographic Characteristic (n = 15)		n
Engineering Major	Mechanical	4
	Aerospace	3
	Electrical	3
	Chemical, Construction, General, Materials Science, Textile	1 each
Year in program	First Year	1
	Second Year	4
	Third Year	4
	Fourth Year	6
Military Branch	Air Force	4
	Navy	4
	Army	3
	Marine Corps	3
	Coast Guard and Air Force	1
Years of Completed Service	1–5	9
	6–10	5
	>20	1
Parental Education Level	Both parents had “some college”	2
	One parent had some college; the other had earned a high school (h.s.) diploma/GED	5
	Both parents had earned a h.s. diploma/GED	5
	One parent had earned a h.s. diploma/GED; the other had not earned a h.s. diploma/GED	3
Sex	Male	14
	Female	1
Race	White	10
	Black	4
	Hispanic/Latino	1

Table 3. Identity Circle Placements for First-Generation Student Veterans in Engineering

Identity Circle Levels	First-Generation	SES	Military	Engineering
Level 1 (inner circle): Primary identity	1	1	9	7
Level 2 (middle circle): Secondary identity	6	4	6	5
Level 3 (outer circle): Tertiary identity	0	5	3	1
Not on Identity Circle	8	5	0	2
TOTAL	15	15	19*	15

* Note: Participants could select more than one military-related identity (e.g., “Veteran in general”, “Navy veteran”, “Reserves”, “combat veteran”, etc.).

tities. For example, fewer than half of the participants (n = 7) placed “first-generation” on their identity circle and 10 of the 15 placed “SES” on their identity circle. Five participants did not place either “first-generation” or “SES” on their identity circle. Only one participant indicated that first-generation status was central to their identity; another indicated that SES was central to their identity. In contrast, military and engineering identity seemed more prominent. The importance of military identity for these participants is emphasized by the fact that all of them included it at least once on their identity circles. With the exception of two respondents, all of them placed “engineering” somewhere on their identity circle, with seven placing it in the central circle, and another five placing engineering identity on the middle circle.

4.3 Case studies

In this section, we use as examples the identity circles constructed by four participants whose identity circles and narratives illustrate the dynamic and overlapping nature of first-generation, SES, engineering, and military identities. (These identities are bolded in the identity circles depicted below.) These four FGSVEs were selected to illustrate four perspectives related to the various participant identities. Also, these four participants indicated that first-generation status was an important element of their identity, allowing us to learn more about the influence of first-generation status for this group of engineering students. We use pseudonyms for both the participants and their institutions (i.e., A-State and B-State) to protect participants’ confidentiality. For each participant, we include a summary

statement, their identity circle (See Figs. 1–4, below), and highlights from their narrative.

4.3.1 Case Study #1—Allan

“The military was a bridge beyond first-generation status and into engineering.”

Allan, a senior in mechanical engineering at B-State, served in the Navy for four years as an electrician. When describing his educational journey, he said because he *“was just kind of clueless”* after high school, he decided to enroll in general studies at a local community college. However, after 2 1/2 years, he ultimately decided to join the Navy because of continued *“lack of direction”* in his life and because he *“never knew what [he] wanted to study.”* He also enlisted in order to serve the country as *“it just felt like the right thing to do . . . I guess 9/11 was still kind of resonating with me, even though it had been a while.”* However, Allan did not envision embarking on a life-long military career; rather, he *“intended to use the military as a stepping-stone”* toward earning a college degree.

Allan’s first-generation status was important to him, as indicated by his placement of this status in the middle circle:

“I’m the first one in my immediate family to go to a four-year college . . . I think my dad did a little bit of technical school. But, he kind of got [where he is] through the good ol’ boy program, and he does well for himself. But, like I said, that’s another thing I take a lot of pride in.”

Allan’s family recognized his achievements; he said that his parents and younger siblings *“definitely look up to me. They’re proud of me.”* And, while they provide Allan with emotional support, he wanted to succeed on his own merits and efforts: *“If I ever need anything, they’re always there for me. But, it’s important to me that I do this on my own.”* Thus, the ability to succeed independently was important

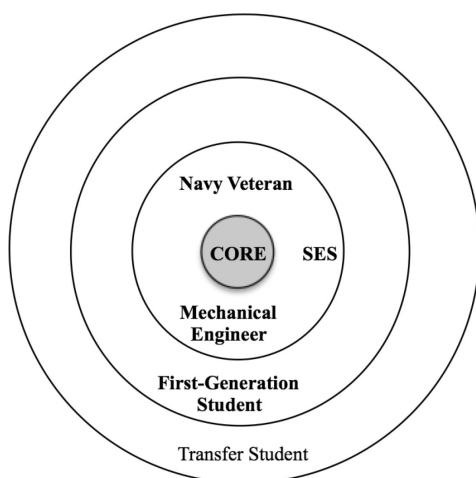


Fig. 1. Allan’s Identity circle.

to Allan, especially given that he is a first-generation student.

After serving in the Navy for four years, Allan decided not to re-enlist. Instead, he attended a community college for 2 1/2 years to *“catch up”* educationally. He ultimately decided to attend B-State due to the reputation of its engineering program. Allan believes his mechanical engineering degree will ultimately allow him to obtain a secure job and achieve a higher socioeconomic status than his parents. For example, when asked why he placed SES in the inner circle, he responded:

“That’s just me wanting to elevate myself to a higher economic class really . . . The job I did in the military was more or less blue-collar work and I did not want to do that for the rest of my life.”

His Rate as an electrician reinforced his drive to escape his social class background and engineering was a route for doing so. His Navy job was technical in nature and made him *“want to go along and keep pursuing higher education for the technical field.”* This job also reinforced his pre-existing interests in engineering and technological pursuits. A self-described *“gear head,”* he now wanted to *“turn his hobby into a career.”*

Allan begins to allude to the overlapping nature of his military, engineering, and first-generation status with this explanation. He states that engineering will allow him to take the next step in life. By majoring in engineering (Level 1), Allan had an opportunity to show others that he could succeed in a challenging major and ultimately achieve upward mobility (SES—Level 1 and first-generation student—Level 2):

“That’s another thing I take a lot of pride in [and] why I put [engineering] inside the first ring . . . a lot of my friends came here and tried this program and couldn’t do it and ended up switching majors. And I’ve stuck it out. . . . When I first got out of the military, I told people I was going to be a mechanical engineer. A lot of people had some doubts and [didn’t think] what I had between the ears would do it.”

Allan explained his placement of “Navy” in the inner ring of the identity circle by citing both the intangible and tangible benefits (for achieving his educational goals) of his military experience:

“I put Navy in there because if it wasn’t for the Navy, odds are I wouldn’t be here right now, because of the GI Bill and everything . . . and it definitely instilled a lot of discipline in me that I did not have when I was younger.”

Thus, his military experience and his engineering major offered him new possibilities and a chance to redeem himself from his reputation as a *“wild and crazy”* teen. His military training also provided him with professional skills that are useful in college. He

saw direct parallels between his military training and engineering education in that for both “*you really have to buckle down and have self-discipline.*” Thus, Allan shares much in common with other engineering students in this respect.

Allan described his veteran status (as a Navy veteran) in positive terms, saying “*I’ve got a veteran tag on my car. That’s one thing I take a lot of pride in.*” However, he also said that he was not involved with the student veteran organization, likely due to competing demands as he said in response to why he’s not involved: “*Honestly, I just kind of come here, I go to class, I do my work, and then I go home.*” Thus, while his military identity was important, it was mainly because the military was a source of college funding and gave him the self-discipline to succeed in a challenging major, more than because his military experiences provided him with a sense of community with other student veterans.

4.3.2 Case Study # 2 - Liam

“The military provided access to higher education and an engineering career will provide financial security.”

Liam, a junior majoring in material science engineering at B-State, joined the Air Force National Guard and initiated his studies at B-State immediately after high school graduation. At the time of the interview, he had been attending college and serving in the National Guard for five years. He joined the military primarily as “*a means of paying tuition.*” While in high school, he researched military educational benefits available to him and ultimately selected the National Guard because that branch “*had the best benefits.*” However, although he was a member of the National Guard, in terms of identifying with a particular military branch, Liam tended

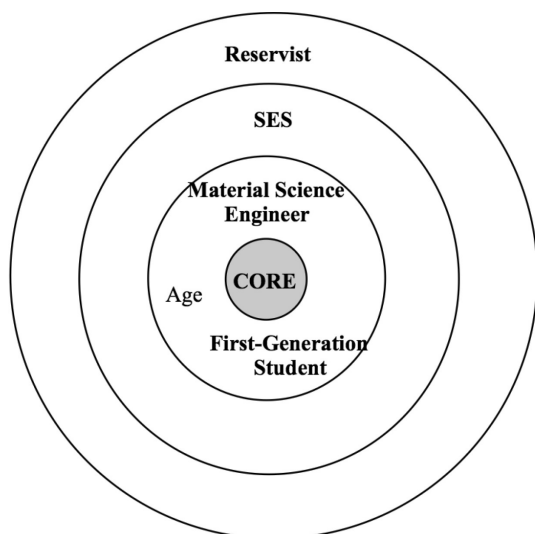


Fig. 2. Liam's Identity Circle.

to use the terms “Reserves” and “National Guard” interchangeably, saying “*I lump it all together with the Reserves because that’s how people recognize it.*”

Liam said he strategically sought out a way to be deployed while serving in the National Guard, as he knew that deployment would make him eligible for additional educational benefits through the Post 9/11 GI Bill, even if it meant that his college pursuits would be interrupted due to the deployments.

This focus on educational benefits and financial assistance was central to Liam's rationale for both joining the military and majoring in engineering. He describes himself as a “*very money-minded individual*” who has carefully planned his financial goals well into the future. The military was essential to his success, as he says “*if I had not had the military, I wouldn't have been able to afford to go to college.*”

Regarding first-generation status (Level 1), Liam said that he “*didn't have much in the way of academic influence*” from his family. Rather, he “*just kind of figured it all out*” and “*everything just kind of fell into place.*” In terms of SES (Level 2), he said “*I take a lot of pride in the fact that I don't have a lot of financial support.*” For him, “*coming from the background of not having very much household income, and still being able to accomplish what I've accomplished, is part of my identity.*” Liam is poignantly aware of the sacrifices his father made to ensure that Liam could attend college:

“He definitely bent over backwards financially to make sure that I was able to get a good education [at a private school]. And part of that is the reason that I think I do so well is because, A, I had a good education, and B, I know how much my father sacrificed to put me through that good education.”

When asked why he majored in engineering, Liam first referred to his parents' educational level, indicating that engineering would allow Liam an opportunity to achieve an educational level above that of his parents:

“An important demographic [is that] my father never graduated high school . . . neither side went to college. I was the first person on my dad's side to graduate high school, and the first person on both sides to go to college.”

Liam was not motivated to major in engineering to be wealthy, per se, but because the potential financial security offered through engineering would allow him to take care of his father:

“I don't want to make a lot of money 'cause I want to be a rich person that makes a lot of money. I want to make enough money that I can make sure that [my father is] squared away and I can take care of him for sacrificing to take care of me.”

This ability to provide intergenerational support was important to Liam. Indeed, being a first-gen-

eration student (Level 1) and growing up in a working-class family (SES—Level 2) had a profound impact on Liam, as evidenced by his response to a question about leadership qualities:

“I’ve been a driven individual . . . I don’t know if that something necessarily that you can inherit. Both of my parents are hard-working individuals . . . they may not have been educated, but they did work hard to get what they have. So, I think part of it is the work ethic that they instilled in me, which is part of why I have success.”

Liam is aware that his educational goals and accomplishments set him apart from his other family members as he is the “*first person in my family to really be successful*.” In particular, he said that his educational accomplishments distinguished him from his two siblings who he says “*both hate me because I’m the good kid who went to college and is in the military and that stuff*.”

As a first-year student, Liam was involved with the B-State first-generation student program, which allowed him to meet people and “[*helped with the transition from the high-school-way-of thinking to the college-way-of-thinking*.” However, financial concerns remained at the forefront of his mind throughout his engineering studies. For example, Liam said that he does not seek tutoring in engineering, even though he missed an entire year of school when deployed and fell behind in his classes: “*I try to stay away from the [tutoring center] because I’m not 100% sure [when] I’m going to start getting charged [for the tutoring services]*.” He did not want to incur additional expenses, even if such tutoring could help him improve his grades.

Although, Liam’s socioeconomic, first-generation, and engineering identities seemed to be important to him, he did not generally feel the same way about his military identity. He said that he has “*kind of gone back and forth over my identity as a Reservist*,” Liam’s identity as a Reservist is “*tertiary because I don’t really think about it all too much*.” He ultimately believes the label of “student veteran” is not central to his identity as he felt has never had to “*deal with all the same day-to-day rigors of being in active duty military*.” So, Reservists like himself “*don’t really know what military life is like*.” However, it is important to note that despite the relatively low ranking of his military identity, Liam still drew pride from his service:

“[Serving in the Reserves is] not really a big time investment, but it is something that I do draw pride from because while I went to it more for the financial side, it does fulfill. . . the service part of me where I do enjoy helping people.”

Overall, then, Liam says that he identifies much more as an engineering student than a Reservist. His engineering major will allow him to achieve finan-

cial independence (aspiring toward, and perhaps ultimately achieving, a status higher than his first-generation background), which would in turn allow him to support his father at a later point in life. And, while the military allowed Liam to serve his country, its appearance on his identity circle was related to the fact that this military service was a source of pride and provided him with the finances to earn his college degree.

4.3.3 Case Study # 3 - Blake

“*There is a dissonance between my first-generation, engineering, and military identities*.”

Blake, a senior in mechanical engineering at A-State, enlisted in the Army immediately after high school graduation, because like Allan, he lacked direction in his life. Joining the military allowed him some time to become more focused: “*I’ll go join the Army and I’ll take a couple of years, and figure out what I want to do*.” He also joined the military to serve his country “*and be a part of something*” larger than himself. Blake served for seven years, including several deployments, and completed his contract in the National Guard after which he left the military and worked at a retail store for a year. He soon “*got tired of that [and thought] ‘I’ve got to go back to school.’*” He quit his job on the “*spur of the moment*,” attended community college for several years, and then enrolled in mechanical engineering at A-State, three years after leaving the military.

Blake expressed pride in his educational accomplishments, especially considering that he was a first-generation student (Level 2): “*After I graduate, the total number of degrees in the house will be two [his own Associate’s and Bachelor’s degrees] and they’ll both belong to me*.” Majoring in engineering allows him to serve as a role model for his niece and

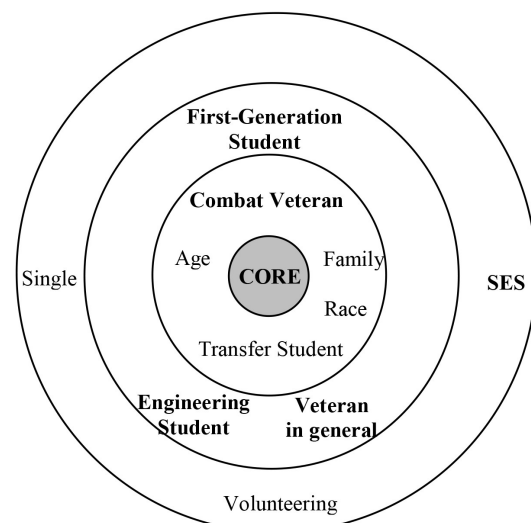


Fig. 3. Blake's Identity Circle.

nephew: *"I feel honored [to serve as a role model]. . . I want them to be more proud of me than I want my parents to be proud of me."*

Blake also recognized that his family's SES background, and subsequent financial constraints, separated him from other students:

"I'm the only one paying for me to be in college so there's no burden on my mom and dad. [Other college students] can do things I can't because I need to save money for next semester or for boots for work or [something] like that. It doesn't make me feel bad . . . It just sucks not being able to do fun things 'cause Mom and Dad aren't paying for it . . . It's not a big deal to be broke. It's just that I'd like not to be."

At the same time, he realized that his educational accomplishments would ultimately put him in a different socioeconomic class than his parents:

"My dad works at [an industrial company] making turbos, and he puts food on the table, and I love him unconditionally. But it's weird to think that [at my internship] . . . the people I talk to are essentially my dad. So, I am in a position above him and that's weird to me."

His choice of engineering was primarily motivated by a problem-solving mindset:

"I wasn't content with things being messed up and so I always just wanted to fix it . . . because you shouldn't have to deal with crappy things. If there's something you can do about it, then do it."

However, he wanted to engage in work other than making *"killing machines"*; rather, he desired to *"do something that benefits mankind as a whole."* He felt that engineering would allow him to do so.

The centrality of Blake's engineering identity was reinforced through his completion of a co-op in the field. The co-op experience was instrumental to his persevering with engineering after experiencing some frustrations at A-State. After the co-op, he thought:

"Yeah, this is something I can do. This is something I enjoy doing. It's not the same as sitting down in front of your computer and just cranking out algebra and equations and stuff like that. It's more dynamic."

In terms of his military identity, Blake placed "combat veteran" in the inner ring of his identity circle, saying that *"there aren't very many of us, and when I do find somebody to click with, it's typically another combat vet."* He placed "veteran in general" on the middle ring of his identity circle, as he said *"[vet] in general, here [on the second ring] 'cause I don't feel more connected to Army vets than I do Navy vets or Marine vets. You know, it's nice to see vets."* He describes how his military experiences have contributed to his success in college and in engineering. For example, when comparing himself to other transfer students, he says:

"Being a veteran allows me to dig a little bit deeper than the other transfer students. Where they would get far more stressed out in certain situations, I can continue working. I have an ability to get four hours of sleep and be a functioning human being somehow."

However, when reflecting further on his engineering identity, he recognized a potential dissonance between his military experiences and engineering education:

"I feel like I need help but sometimes I'm embarrassed to ask for it because in the Army I didn't . . . if I did need help I could either figure it out or I can just ask somebody and it wasn't a big deal. But, [now] I feel like I should be able to handle it . . . going to the professor is almost like admitting defeat, and you know, [I'm] a bit stubborn."

In this regard, Blake felt that the institution does not give enough support to veterans on campus. For example, he did not know there was a student veteran group on campus until his second or third semester at A-State. He recognized that student veterans were beginning to get some attention and resources, but he attributes that to the efforts of the student veterans themselves, rather than resulting from overt support from the institution:

"[We said] 'We need a place for veterans to go.' And . . . six years later [the institution says] 'We may [have] a closet for you guys. You're OK with brooms, right?' So, it's things like that . . . But, being selfish, like I want a place for other engineers, or other veterans to go, just like a beacon. Like if we can get like a neon sign with the biggest American flag coming out of this thing."

For Blake, then, his first-generation status and SES seemed to distinguish him from others (e.g., his own family members and other students). His military status and engineering identity overlapped in complicated ways, being both complementary and dissonant.

4.3.4 Case Study # 4: Gerald

"The military was both a detour and a necessary pathway into engineering education."

At the time of the interview, Gerald was a junior majoring in Aerospace Engineering at A-State. After high school graduation, Gerald said he *"had no direction."* He attended college for a year but quickly *"realized that that wasn't going to go anywhere."* He dropped out of school and returned home, but recognized that he needed to find a way to pay his student loans. Like Liam and Allan, Gerald decided to join the military to gain some focus in his life: *"I hadn't taken a path academically that would've given me a lot of choices career-wise, so that's kind of how I ended up in the military by default."* He ultimately joined the Marine Corps Reserves at the age of 19 and served for four years.

After leaving the Reserves, Gerald attended a for-

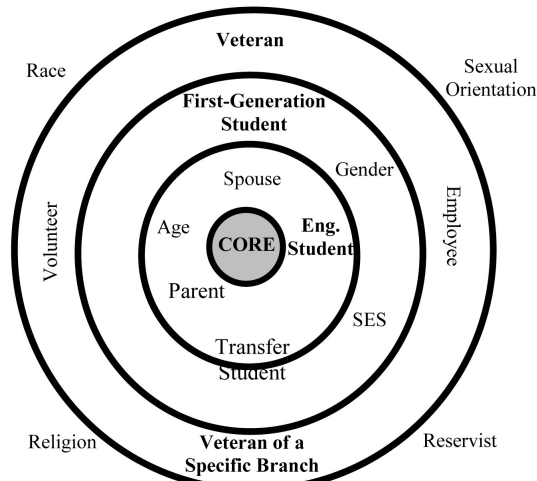


Fig. 4. Gerald's Identity Circle

profit college, enrolling in remedial math classes to prepare him to transfer to a community college, where he then earned additional academic credit for math prerequisites for engineering. These were important bridging experiences for Gerald:

"I never would've been able to get accepted [to A-State]; I had no academic history. I had to build an academic track record in order to be able to apply and say that I'm serious about this and I can handle the material."

Gerald's placement of first-generation student in the middle circle of his identity circle reflects his desire to improve his station in life, through engineering:

"[SES is] important for me because just knowing where I came from, my family was pretty poor growing up and that was a huge influence . . . I think I feel like what my opportunities were like as an early adult, which of course is why I'm having to struggle so hard right now . . . that's a big factor in determining how I am."

Particularly given his circuitous route into college, education is very important to Gerald; he is "*proud of the fact that I was a transfer student. I feel like I've really had kind of a hard-fought journey . . . and getting through my education is going to be a huge thing for me . . . [as is being a] first-generation [student], too.*"

It was only upon entering the military that he began to consider the engineering career pathway as he saw some parallels between engineering and his military job as a combat engineer:

"I thought a lot about what types of career I'd want to do, and having that allegory in the military at least got me thinking about civilian engineering and eventually kind of decided that that would be a really good fit for me."

Now that he is in engineering education at A-State, however, his military identity was less important than his other identities. He placed "veteran" and

"Marine veteran" in the outer circle and "Reservist" on the edge of the identity circle, saying that at this point in his career:

"I feel like as far as my personal identity I'm not as attached to my military identity as a lot of veterans [are] . . . I feel like it was something that I went through, and it was something that kind of built an experience for me but I don't feel like it's really core to my identity personally . . . Reservist even less, 'cause I don't feel like that's a super-important designation. I am a little bit proud of the fact that I was a Marine . . ."

Overall, Gerald considers his time in the military "*as a detour*"; in fact, he says that he feels "*like it was a mistake.*" But, he also realizes that the military gave him "*that discipline and direction*" and thus "*it's part of what got me here.*" Gerald states that he "*would've been a lot more successful in his life*" if he were more motivated upon graduating from high school, rather than relying on the military to turn his life around. Ultimately, the military shaped him "*in good ways and bad.*" Specifically,

" . . . the discipline that I picked up in the Marine Corps and the ability to kind of press on through tough times, and kind of compartmentalize a little bit. I don't think I'd be able to get through this program of study without it and everything that's happened in my life."

The military instilled the discipline and motivation that are valuable to his engineering education: "*it's not enough to just get through. I have to make sure that I do the best that I can at everything I do . . .*" His military experiences provided that "*little extra bit of fortitude that I'm sure I didn't have before I was in the military.*" Thus, the military was an essential part of his educational pathway in engineering, despite his reluctance to embrace the military as central to his identity at the time of the interview.

5. Discussion and implications

Our multi-method qualitative study investigated the experiences of a subpopulation of first-generation students that has received little attention from researchers: student veterans in engineering. Our study provided a unique opportunity to more closely examine the intersection between three student identities relevant to equity in higher education—first-generation students who, as "educational pioneers" [45] seek upward mobility through higher education; military veterans, many of whom receive government funding for a college education that they would otherwise likely not be able to afford; and engineering student. Our emphasis on participants' perceptions of the relative salience of identity extends our prior research on first-generation students veterans in engineering [46] and fills a research gap on student veteran identity. Through in-depth analysis of the participants' identity circles and the

accompanying narratives, several important themes about relative identity salience emerged.

Our results confirm Overton-Healy's phenomenological study of first-generation students transitioning out of college to the labor force [47]. Her research showed that the salience of first-generation status was fluid, important to some students and not to others. Overall, our participants did not identify first-generation status as central to their identities or experiences, with eight of the 15 not placing first-generation on their identity circle. By the time our study participants entered the engineering pathway, their first-generation status was not as important to them as other elements of their identity. Only one of our study participants (Liam) indicated he was involved in a program targeted toward first-generation students. FGSVE may make an overt decision to reduce the visibility of (or compartmentalize) their first-generation status within engineering education [48]. Given that some first-generation students may not want to be vocal about their first-generation status [4], student services personnel may target other elements of their identity for programmatic services. For example, Wurster et al.'s [28] study showed that letting go of one's first-generation status could help student veterans better cope with the transition to college. These results have implications for programming for student veterans. For example, programs focusing solely on first-generation status may not appeal to FGSVE as much as programs and initiatives that highlight their contributions to engineering education and that allow them to apply their military training to classroom initiatives.

All four of the FGSVEs profiled here said that identifying as a first-generation student generated positive feelings, a finding supported by other studies [4, 37, 49]. First-generation status is a source of pride and motivation for succeeding in their engineering studies, likely as a result of the intersection of their various identities as a military veteran, engineering major, and a first-generation student. Their first-generation status motivated them to succeed in engineering studies and create a better life for their own families. Such a sense of accomplishment is essential for student veterans as it is associated with their more positive life adjustment [50].

Nevertheless, the literature documents that FGS may be reluctant to identify as first-generation because of the assumption that FGS in general are less committed to their student role [4]. The FGSVEs featured here, however, were very committed to their studies, especially because they had sacrificed so much to get to college. This intersection of engineering and veteran identities was a contributing factor to their success in college since they

found their experiences in the military supported their technical studies and gave them assets in terms of work ethic and professional skills. Given the relatively equal importance of the military and engineering identities reported by our participants, educators should consider how to integrate these students' experiences into their classrooms. Making these connections to the course material will give veterans the opportunity to share their experiences and give other students an opportunity to learn from their peers [51]. Such connections could likely increase the student veterans' feelings of self-efficacy, a factor that has been identified as having a strong positive effect on student veterans' college grade point average [52] and on the transition from the military to college [53].

All respondents were in the midst of pursuing their engineering degrees at the time of the interview; therefore, it is not surprising that their status as an engineering student was central to their identity. First-generation status may not seem as essential to their identities because they have more life experiences and their intense military experiences have matured them to a new life beyond their families of origin. That is, the participants' military identity was important as a background motivator, much like first-generation status. The military experiences may have provided advantages and assets to counteract the experiential disadvantages of first-generation status that have been documented in the literature. In other words, their military experiences provided the life experiences that enabled them to succeed, above and beyond what other first-generation students experience. Recognizing these differences of FGSVE from other FGS should help inform universities' efforts to support these students.

The MMIDI and constellations of identity theoretical frameworks were useful for interpreting these FGSVEs' experiences and to delineate the salience of the various identities and areas of overlap between the identities. The ebb and flow of identity salience over time and the evolving nature of identity paralleled constellation theory's contention that these FGSVEs "were not approaching an 'intersection' in their life; rather they were experiencing different degrees of magnitude" [14, p. 143]. Importantly, the flexibility and possibility for change implied in MMIDI and the constellations of identity framework allowed an asset-based framework to emerge. That is, the participants' rhetoric was not grounded in the disadvantages and deficits of first-generation or student veteran experiences. Rather, our participants seemed to be aware of the advantages that they bring to engineering education, echoing Byrd and MacDonald's finding that FGS are well aware of their strengths [54]. This behooves

the field to move toward an asset-based framework for understanding student veteran educational experiences [50], as has begun with other populations in engineering [55, 56]. Our prior study on first-generation transfer students in engineering validated the utility of applying Yosso's theory of Community Cultural Wealth to first-generation engineering students [10]. Future studies in engineering education can apply these theories to address different research questions in various contexts that could benefit from an intersectional approach to identity.

It is important to note that while the four participants indicated that the military-provided benefits were essential for pursuing higher education, one cannot assume that they are financially stable. A 2015 survey found that more than half of student veteran respondents said that they did not have enough financial resources to stay in college, even with their military benefits [57]. Thus, given the importance of financial support to FGSVEs, and the pride they experience for being able to support themselves, program administrators should be aware that all of their financial needs may not be met through the GI Bill and other sources of government support, such as the Yellow Ribbon Education Enhancement Program.

While we recognize the limitations of our sample size of four for the in-depth narratives, the participants' narratives offer detailed insights into their experiences and perceptions of identity. Methodologically, the identity circle allowed us to learn more about the complex nature of identities as enacted by FGSVE, helping us to delve more deeply into the intersectional and overlapping nature of the participants' identities, as well as the main themes of pride and promise. Indeed, as Liam expressed when initiating his discussion of his completed identity circle:

“It's an interesting question to ask someone kind of how they identify themselves. What first comes to mind [are] the things that I'm really proud of, the things that I draw pride from about myself as it applies to my education.”

Our results do not represent the experiences of all student veterans in engineering. The technique holds promise for more fully exploring identity enactment and salience in other engineering education contexts. For example, we have used the method in research of identity salience for women student veterans in engineering [12].

As our study focused on those students who have persisted in engineering it is important to more fully explore the experiences and identities of those FGSVEs who have left engineering to learn more about the factors contributing to attrition. Given

the limited research on identity enactment in the disciplines, engineering education can lead the way through more careful and in-depth study on this topic. Of course, student veterans studying in engineering programs worldwide may have different benefits and experiences. Future research on student veterans outside the USA is needed to understand how their experiences and identities vary by nation-state.

6. Conclusions

Our multi-method qualitative study adds to research on identity salience of FGS and student veterans. Participants described their identities more in terms of their military service and engineering major, than their SES and first-generation statuses. As reflected in the case studies, the military provides both a motivation to succeed and a direction for pursuing career goals. It seems likely that the intangible benefits of military experience not only helped our participants to overcome possible challenges due to their first-generation status, but are also helped these FGSVEs to succeed in engineering.

Overall, the data indicate that FGSVEs may not be interested in identity-based programs based on their first-generation status. Thus, student services personnel and engineering educators may want to focus more on enhancing opportunities to strengthen their engineering identity and focus less on their first-generation status. Further, pride in succeeding in a difficult major, the prospect of going into a field that will allow them upward mobility, and a promise for a better life ahead could be powerful messages to use for recruiting first-generation military veterans into engineering majors.

Acknowledgements—This material is based upon work supported by the USA National Science Foundation under Grant Numbers 1428512 and 1428646. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation. The authors are grateful for the guidance of the project's External Advisory Board, the participants for sharing their stories, the support of Joseph Murphy (undergraduate research assistant), and the support of the National Science Foundation.

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Catherine E. Brawner is President of Research Triangle Educational Consultants. She received her PhD in Educational Research and Policy Analysis from NC State University in 1996. She also has an MBA from Indiana University (Bloomington) and a bachelor’s degree from Duke University. She specializes in evaluation and research in engineering and computer science education. Dr. Brawner is a founding member and former treasurer of Research Triangle Park Evaluators, an American Evaluation Association affiliate organization and is a member of the American Educational Research Association and American Evaluation Association and the American Society for Engineering Education. Dr. Brawner is also an Extension Services Consultant for the National Center for Women in Information Technology (NCWIT) and, in that role, advises computer science departments on diversifying their undergraduate student population. She currently serves as the principal evaluator for National Science Foundation funded S-STEM and INCLUDES programs. She maintains an active research partnership with the Multiple Institution Database for Investigating Engineering Longitudinal Development (MIDFIELD), studying diverse populations in engineering, academic policies, transfer students, and matriculation models in engineering.

Susan M. Lord is Professor and Chair of Engineering and Professor of Electrical Engineering at the University of San Diego (USD). She received a BS from Cornell University and the MS and PhD from Stanford University. Her research focuses on the study and promotion of diversity in engineering including student pathways and inclusive teaching. Her research has been sponsored by the National Science Foundation (NSF). Drs. Lord and Camacho are among the first to study Latinos in engineering and coauthored *The Borderlands of Education: Latinas in Engineering*. Dr. Lord is a Fellow of the IEEE and ASEE and is active in the engineering education community including serving as General Co-Chair of the Frontiers in Education (FIE) Conference, on the FIE Steering Committee, and as President of the IEEE Education Society. She is Co-Director of the National Effective Teaching Institute (NETI). Dr. Lord is an Associate Editor of the *IEEE Transactions on Education* and the *Journal of Engineering Education*. She and coauthors have received best paper awards from the *Journal of Engineering Education* and the *IEEE Transactions on Education*. She spent a sabbatical in 2012 at Southeast University in Nanjing, China. Dr. Lord is currently on the USD team implementing “Developing Changemaking Engineers”, an NSF-sponsored Revolutionizing Engineering Education (RED) project. Dr. Lord is the 2018 recipient of the IEEE Undergraduate Teaching Award.

Michelle M. Camacho, PhD, is Professor and Faculty Administrator at the University of San Diego. She currently holds an appointment in the department of Sociology, with affiliate-faculty roles in the Department of Ethnic Studies, and the Program in Women and Gender Studies. Camacho brings 30 years of experience advocating for the creation of greater access to higher education. She is an advocate of high-impact teaching practices, as well as community-based, action-oriented research. As a former first-generation college student and Pell grant recipient, and bilingual/bicultural Latina, she understands the hopes and challenges of many diverse students. The National Science Foundation has funded Camacho’s interdisciplinary research programs since 2005 to investigate inequities in higher education, specifically in engineering education, as they relate to the low numbers of women and under-represented minorities. In 2015–2016 she was nominated and selected to be a Fellow of the American Council on Education (ACE) for an academic year at UC San Diego. The ACE Fellows Program is the nation’s premier higher education leadership development program preparing senior leaders to serve American colleges and universities. Camacho is recognized as a distinctive teacher/scholar, and has received awards including the *University Professor Award*, the highest academic honor bestowed university-wide; the *Innovation in Experiential Education Award*; *McNair Mentor of the Year* award; and a *Fulbright Scholar Award*. In 2017, Camacho received the administrative *Woman of Impact Award* for “living principles of social justice” and “making an impact” on campus through work and connections with others.